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| Main Menu | Search Form | Posting Counts | Show S Numbers | Edit S Numbers | Preferences | Cases |

Search Results -

Terms	Documents
L5 and (dimension or component$ or measur$6)	30

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US Patents Full-Text Database
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Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L6

| Refine Search |

| Recall Text | Clear |

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DATE: Thursday, October 03, 2002   Printable Copy   Create Case

Set Name	Query	Hit Count	Set Name
side by side			result set
	DB=USPT; PLUR=YES; OP=ADJ		
L6	L5 and (dimension or component$ or measur$6)	30	L6
L5	L4 and ((705/$).ccls.)	30	L5
L4	L3 and tim$3 same occur$6 and (medical$5 or hospital$6) same (condition or history)	360	L4
L3	(select$3 or choos$3) same profil$3	28488	L3
L2	L1 and (select$3 or choos$3) same profil$3 same tim$3 same occur$6	0	L2
L1	(5613072).pn.	1	L1

END OF SEARCH HISTORY

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End of Result Set

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L12: Entry 1 of 1   File: USPT   Dec 4, 1990

DOCUMENT-IDENTIFIER: US 4975840 A
TITLE: Method and apparatus for evaluating a potentially insurable risk

US PATENT NO. (1):
4975840

Abstract Text (1):
A method and apparatus for evaluating the insurability of a potentially insurable risk
has data bases for storing information, and the ability to correlate selected elements
of information in respective data bases. Certain elements are assigned weights on the
basis of predetermined relationships existing between elements of information in one
data base and corresponding elements of information in another. Information is
displayed from a data base for use by an underwriter in assigning a weight to a
selected element, or an expert module corresponding to the selected element is
identified and used for assigning the weight. A risk classification is determined for
the potentially insurable risk from the weights assigned. The system can identify
additional elements of information required for evaluating the potentially insurable
risk, and can request entry of such information for subsequent storage. In one
embodiment, the system can identify an element of information for which no
corresponding information exists, and for which no expert module exists. Other features
include the ability to override an expert module and assign a different weight to an
element of information, the use of statistical profiles to adjust assigned weights, the
ability to determine expected profitably resulting from decisions concerning a
particular risk, and the provision of additional data bases useful in managing workload
and customizing operation of the system.

Detailed Description Text (5):
Memory 12 includes application data base 20, installation specific data base 22,
underwriting knowledge base 24, underwriter file 26 and management information data
base 28. Application data base 20 contains all information collected from the applicant
or applicants, including personal data (age, address, occupation, avocations, income
level, etc.), medical information (prior medical problems, existing conditions,
medications, etc.), and any other information received from the applicant which may
have a bearing on insurability. In addition, application data base 20 may contain the
results of medical tests and examinations, inspection reports, medical histories, and
other information provided by third parties bearing on the question of insurability of
the applicant.

Detailed Description Text (7):
Underwriting knowledge base 24 is the information base that drives the system. It
incorporates the copyrighted information contained in the underwriting manuals used by
the assignee of the present invention. Underwriting knowledge base 24 is divided into
textual elements that describe the underwriting process, factual elements on specific
medical conditions or impairments impacting upon mortality, and programmed knowledge,
in the form of expert modules, which expertly direct the system user through the
underwriting process for selected problems or impairments. Examples of the information
related to specific impairments (e.g., blood pressure--hypertension and build) which
are included in knowledge base 24 are attached to this specification as Appendix A. An
example of the programmed knowledge base, or expert modules, which are included in
knowledge base 24 is illustrated in FIGS. 8-10 which are discussed in detail below.

Detailed Description Text (9):
Underwriting knowledge base 24 is logically organized as illustrated in FIG. 2.
Underwriting knowledge base 24 includes, on a first "branch" 30, information on each

major body system and various medical impairments associated therewith. Branch 30 further includes a programmed knowledge base which includes one or more expert modules relating to medical conditions (e.g., asthma) which are used in analyzing information provided from application data base 20, installation specific data base 22, or other parts of memory 12. Branch 32 includes non-medical text material explaining the underwriting approach used in connection with non-medical impairments (e.g., avocations, such as mountain climbing), along with the associated expert modules (see, for example, FIGS. 8-10). Branch 34 includes information relating to financial considerations, and the expert modules associated therewith. Branch 36 includes additional underwriting reference materials (e.g., laboratory values, abbreviations, a dictionary of medical terms, etc.) in readily available form for the user.

Detailed Description Text (10):
For purposes of this discussion, the term "problem" will generally mean an element of information (e.g., facts and conditions such as age, a medical condition, a hazardous avocation, a smoking or drinking habit, etc.) stored in application data base 20 which impacts either positively or negatively upon the relative mortality of the proposed insured. The term "impairment" will generally mean an element of information (e.g., the impacts of aging, various medical conditions, avocations, smoking, drinking, etc. on the mortality of known populations) stored in underwriting knowledge base 24 which relates to or corresponds with the information contained in application data base 20. Each impairment is associated with textual information and/or an expert system or module which is intended to assist the system operator in quantifying the impact of a particular problem (by reference to a corresponding impairment) upon expected mortality in a particular instance. In broad terms, the approach to evaluating or underwriting a given risk which is incorporated into the process of the present invention includes the following steps:

Detailed Description Text (36):
a. define medical problems from the applicant's health complaints, symptoms, use of medications, history of medical consultations, surgeries, tests, etc.;

Detailed Description Text (37):
b. define medical problems from the applicant's medical history or family history of specified illnesses;

Detailed Description Text (47):
FIG. 4 shows a flow chart which illustrates the process of resolving or underwriting the problems identified in the course of initial underwriting. After a case has been assigned to a designated underwriter, in accordance with the above discussion relating to FIG. 3, and the selected underwriter logs onto the system (after entering the appropriate password and satisfying other applicable security measures), the underwriter selects a case to be underwritten. This procedure is generally represented by block 54 in FIG. 4. It is presently contemplated that the underwriter to which cases will be assigned by the system is a relatively highly skilled individual, and is not likely to be the same individual who will operate the system through the data collection, screening and entry process and through initial underwriting. However, in certain circumstances, it may be useful or desirable for a single individual, having the requisite level of skill, to complete the entire process as illustrated in both FIGS. 3 and 4. It should also be clearly understood that use of the term "underwriter" in this application does not necessarily restrict the use or value of the present system to those presently recognized as "underwriters" in the insurance industry of today. While such individuals will surely benefit from the present system, the benefits and advantages offered by the system in the underwriting process may very well expand or otherwise change the current definition of the term "underwriter" such that individuals who would not necessarily be deemed underwriters in the present industry may be able to function in an underwriting capacity with the aid of the present system. Accordingly, use of the term "underwriter" in the present application should not be construed to be limiting in any way to the applicability or scope of the present invention.

Detailed Description Text (64):
Referring now to FIG. 6, each problem in a particular case is considered on an individual basis. Underwriting knowledge base 24 is first checked for the existence of an expert module (block 90). If an expert module is available, it is used for underwriting the subject problem unless the underwriter is rated as an expert underwriter with regard to the subject problem, in which case the system provides the underwriter an option to override the expert module (block 92). If the underwriter cannot override the expert module, or if a qualified underwriter chooses to use the
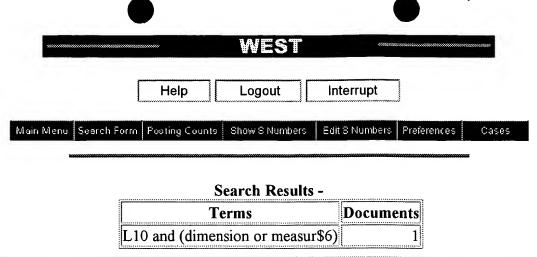
expert module to underwrite the problem (block 94), the system proceeds with underwriting using the expert module (block 96). For purposes of illustration, an expert module used when the initial underwriting process indicates that the applicant participates in mountain climbing activities is illustrated by the flow charts of FIGS. 8-10. Referring to FIG. 8, the expert module first determines whether the proposed insured is ratable for a medical impairment. If so, the system recommends that coverage be declined, pending submission of the case for special consideration. If the proposed insured is not ratable for a medical impairment, the system determines whether the proposed insured is ratable for alcohol or illicit drug use, or a relevant driving history. If so, the system recommends that coverage be declined. If not, the system inquires as to where the proposed insured intends to climb. If unknown, the system requests that this information be obtained via a mountain climbing questionnaire. If climbing is to be done in locations other than North America, coverage is declined If climbing is to be done in the U.S.A. only, the system inquires as to how long the proposed insured has been mountain climbing. If unknown, use of the mountain climbing questionnaire to obtain this information is recommended. If the proposed insured has been climbing for less than two years, a rating for mountain climbing of, for example, $3.50 per $1,000 requested coverage is recommended. If the proposed insured has been climbing for more than two years, no additional premium related to mountain climbing is required After making the latter two determinations, the system branches to FIG. 10 wherein it is determined if the proposed insured climbs more than six times per year. If not, the previously determined rating is displayed on the basic rating screen. If yes, an additional factor of $2.50 per $1,000 is added to the previous rating for mountain climbing, prior to display of the basic rating screen.

Detailed Description Text (77):
When no other problems remain to be underwritten, user adopted statistical profiles may be used to adjust one or more of the weights assigned to selected problems on the basis of previously stored statistical profiles relating to the selected problems. A profile is developed when a statistically proven correlation affecting the final rating or weight applicable to a particular problem has been found to exist, and the subject correlation is not reflected in the treatment of the impairment in underwriting data base 24. For example, a cardiovascular profile has been developed which adjusts the overall mortality risk on the basis of factors shown by studies to be predictive of premature mortality from arteriosclerotic heart disease (i.e., factors such as high cholesterol and high blood pressure). System switches are available which allow management, as a matter of policy, to either use or bypass profiles in the system. Additional profiles can be added as statistical correlations warrant.

CLAIMS:

5. Information processing apparatus according to claim 2, further comprising means for storing at least one statistical profile relating to a selected element of information from the first data base, and means for adjusting the weight assigned to at least one of said elements of information on the basis of said statistical profile.

26. The method of claim 23, comprising the additional steps of storing at least one statistical profile relating to a selected element of information from the first data base, and adjusting one or more of the weights assigned to the elements of information from the first data base on the basis of said statistical profile.

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| Help | Logout | Interrupt |

| Main Menu | Search Form | Posting Counts | Show S Numbers | Edit S Numbers | Preferences | Cases |

Search Results -

Terms	Documents
L10 and (dimension or measur$6)	1

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Search:

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L11 and (condition or history)
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Search History

DATE: Thursday, October 03, 2002   Printable Copy   Create Case

Set Name (side by side)	Query	Hit Count	Set Name (result set)
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L8	4975840.pn.	1	L8
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L5	L4 and ((705/$).ccls.)	30	L5
L4	L3 and tim$3 same occur$6 and (medical$5 or hospital$6) same (condition or history)	360	L4 *scanned all*
L3	(select$3 or choos$3) same profil$3	28488	L3
L2	L1 and (select$3 or choos$3) same profil$3 same tim$3 same occur$6	0	L2
L1	(5613072).pn.	1	L1

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L6: Entry 20 of 30   File: USPT   Nov 10, 1998

DOCUMENT-IDENTIFIER: US 5835897 A
TITLE: Computer-implemented method for profiling medical claims

Abstract Text (1):
A computer-implemented program for profiling medical claims to assist health care managers in determining the cost-efficiency and service quality of health care providers. The software program allows an objective means for measuring and quantifying health, care services. An episode treatment group (ETG) is a patient classification system with groups that are clinically homogenous (similar cause of illness and treatment) and statistically stable. ETG grouper software uses service or segment-level claim data as input data and assigns each service to the appropriate episode. The program identifies concurrent and recurrent episodes, flags records, creates new groupings, shifts groupings for changed conditions, selects the most recent claims, resets windows, makes a determination if the provider is an independent lab and continues to collect information until an absence of treatment is detected.
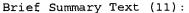
Brief Summary Text (2):
The present invention relates generally to computer-implemented methods for processing medical claims information. More particularly, the present invention relates to a computer-implemented method for receiving input data relating to a person's medical claim, establishing a management record for the person, establishing episode treatment groups to define groupings of medical episodes of related etiology, correlating subsequent medical claims events to an episode treatment group and manipulating episode treatment groups based upon time windows for each medical condition and co-morbidities.

Brief Summary Text (5):
Performance is quickly becoming the standard by which health care purchasers and informed consumers select their health care providers. Those responsible for the development and maintenance of provider networks search for an objective means to measure and quantify the health care services provided to their clients. Qualitative and quantitative analysis of medical provider performance is a key element for managing and improving a health care network. Operating a successful health care network requires the ability to monitor and quantify medical care costs and care quality. Oftentimes, success depends on the providers' ability to identify and correct problems in their health care system. A need exists, therefore, for an analytical tool for identifying real costs in a given health care management system.

Brief Summary Text (6):
To operate a more efficient health care system, health care providers need to optimize health care services and expenditures. many providers practice outside established utilization and cost norms. Systems that detect inappropriate coding, eliminate potentially inappropriate services or conduct encounter-based payment methodology are insufficient for correcting the inconsistencies of the health care system. When a complication or comorbidity is encountered during the course of treatment, many systems do not reclassify the treatment profile. Existing systems do not adjust for casemix, concurrent conditions or recurrent conditions. A system that compensates for casemix should identify the types of illnesses treated in a given population, determine the extent of resource application to specific types of illnesses, measure and compare the treatment patterns among individual and groups of health care providers and educate providers to more effectively manage risk. When profiling claims, existing systems establish classifications which do not contain a manageable number of groupings, are not clinically homogeneous or are not statistically stable. A need exists, therefore, for a patient classification system that accounts for differences in patient severity and establishes a clearly defined unit of analysis.

Brief Summary Text (11):
The Tawil patent, U.S. Pat. No. 5,225,976, issued in 1993, discloses an automated health benefit processing system. This system minimizes health care costs by informing the purchasers of medical services about market conditions of those medical services. A database includes, for each covered medical procedure in a specific geographic area, a list of capable providers and their charges. A first processor identifies the insured then generates a treatment plan and the required medical procedures. Next, the first processor retrieves information related to the medical procedures and appends the information to the treatment plan. A second processor generates an actual treatment record including the actual charges. A third processor compares the plan and the actual records to determine the amounts payable to the insured and the provider.

Brief Summary Text (17):
The Torma, et al. patent, U.S. Pat. No. 5,365,425, issued in 1994, discloses a method and system for measuring management effectiveness. Quality, cost and access are integrated to provide a holistic description of the effectiveness of care. The system compares general medical treatment databases and surveyed patient perceptions of care. Adjustments based on severity of illness, case weight and military costs are made to the data to ensure that all medical facilities are considered fairly.

Brief Summary Text (18):
Health Chex's PEER-A-MED computer program is a physician practice profiling system that provides case-mix adjusted physician analysis based on a clinical severity concept. The system employs a multivariate linear regression analysis to appropriately adjust for case-mix. After adjusting for the complexity of the physician's case-load, the system compares the relative performance of a physician to the performance of the peer group as a whole. The system also compares physician utilization performance for uncomplicated, commonly seen diagnosis. Because the full spectrum of clinical care that is rendered to a patient is not represented in its databases, the system is primarily used as an economic performance measurement tool. This system categorizes the claims into general codes including acute, chronic, mental health and pregnancy. Comorbidity and CPT-4 codes adjust for acuity level. The codes are subcatagorized into twenty cluster groups based upon the level of severity. The system buckets the codes for the year and contains no apparent episode building methodology. While the PEER-A-MED system contains clinically heterogeneous groupings, the groupings are not episode-based and recurrent episodes cannot be accounted.
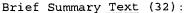
Brief Summary Text (22):
Value Health Sciences offers a value profiling system, under the trademark VALUE PROFILER, that utilizes a DB2 mainframe relational database with 1,800 groups. The system uses ICD9 and CPT-4 codes which are bucket codes. Based on quality and cost-effectiveness of care, the system evaluates all claims data to produce case-mix adjusted profiles of networks, specialties, providers and episodes of illness. The pseudo-episode building methodology contains clinically pre-defined time periods during which claims for a patient are associated with a particular condition and designated provider. The automated practice review system analyzes health care claims to identify and correct aberrant claims in a pre-payment mode (Value Coder) and to profile practice patterns in a post-payment mode (Value Profiler). This system does not link signs and symptoms and the diagnoses are non-comprehensive because the profiling is based on the exclusion of services. No apparent shifting of episodes occurs and the episodes can only exist for a preset time because the windows are not recurrent.

Brief Summary Text (23):
The medical claim profiling programs described in foregoing patents and non-patent literature demonstrate that, while conventional computer-implemented health care systems exist, they each suffer from the principal disadvantage of not identifying and grouping medical claims on an episodic basis or shifting episodic groupings based upon complications or co-morbidities. The present computer-implemented health care system contains important improvements and advances upon conventional health care systems by identifying concurrent and recurrent episodes, flagging records, creating new groupings, shifting groupings for changed clinical conditions, selecting the most recent claims, resetting windows, making a determination if the provider is an independent lab and continuing to collect information until an absence of treatment is detected.

Brief Summary Text (26):
It is a further object of the present invention to provide a medical claims profiling system that allows an objective means for measuring and quantifying health care services.

Brief Summary Text (32):
It is a further object of the present invention to provide a <u>medical</u> claims profiling
system that shifts groupings for changed clinical <u>conditions</u>.

Brief Summary Text (34):
It is a further object of the present invention to provide a <u>medical</u> claims profiling
system that resets windows of time based upon complications, co-morbidities or
increased severity of clinical <u>conditions</u>.

Brief Summary Text (38):
The foregoing objectives are met by the present system which allows an objective means
for <u>measuring</u> and quantifying health care services based upon episode treatment groups
(ETGs). An episode treatment group (ETG) is a clinically homogenous and statistically
stable group of similar illness etiology and therapeutic treatment. ETG grouper method
uses service or segment-level claim data as input data and assigns each service to the
appropriate episode.

Brief Summary Text (40):
ETGs can identify a change in the patient's condition and shift the patient's episode
from the initially defined ETG to the ETG which includes the change in condition. ETGs
identify all providers treating a single illness episode, allowing the user to uncover
specific treatment patterns. After adjusting for case-mix, ETGs <u>measure</u> and compare the
financial and clinical performance of individual providers or entire networks.

Brief Summary Text (50):
Management and surgery records serve as "anchor records." An "anchor record" is a
record which originates a diagnosis or a definitive treatment for a given <u>medical</u>
<u>condition</u>. Management and surgery records serve as base reference records <u>for facility</u>,
<u>ancillary</u> and drug claim records relating to the diagnosis or treatment which is the
subject of the management or surgery record. Only management and surgery records can
serve to start a given episode.

Drawing Description Text (12):
FIG. 10 is diagrammatic timeline illustrating a hypothetical patient diagnosis and
<u>medical</u> claims <u>history</u> during a one year period and grouping of claim records as
management records and ancillary records with cluster groupings.

Detailed Description Text (5):
The inventive <u>medical</u> claims profiling system defines Episode Treatment Groups (ETGs).
The number of ETGs may vary, depending upon the definitional specificity the health
care management organization desires. Presently, the inventive system defines 558 ETGs,
which are assigned ETG Numbers 1-900 distributed across the following <u>medical</u> areas:
Infectious Diseases, Endocrinology, Hematology, Psychiatry, Chemical Dependency,
Neurology, Ophthalmology, Cardiology, Otolaryngology, Pulmonology, Gastroenterology,
Hepatology, Nephrology, Obstetrics, Gynecology, Dermatology, Orthopedics and
Rheumatology, Neonatology, Preventative and Administrative and Signs and Isolated
Signs, Symptoms and Non-Specific Diagnoses or <u>Conditions</u>. Under the presently existing
system, ETG 900 is reserved to "Isolated Signs, Symptoms and Non-Specific Diagnoses or
<u>Conditions</u>," and is an ETG designation used where the diagnosis code is incapable of
being assigned to another ETG. A listing of exemplary ETGs for typical episodes is
attached as TABLE 1. Those skilled in the art will understand, however, that the number
of ETGs may change, the ETG numbering system is variable, the ETG classifications may
be defined with relatively broader or narrower degrees of specificity and the range of
<u>medical</u> specialties may be greater or fewer, as required may be require by the
management organization in their <u>medical</u> claims data analysis protocols.

Detailed Description Text (13):
To determine specific treatment patterns and performance contributions, the
computer-implemented method identifies all providers treating a single illness episode.
If a network of providers contains Primary Care Physicians (PCP), the ETGs clearly
identify each treatment episode by PCP. Financial and clinical performance of
individual providers or entire networks may be monitored and analyzed. To monitor
health care cost management abilities of providers, <u>components</u> of a provider's
treatment plan may be analyzed by uncovering casemix-adjusted differences in direct
patient management, the use of surgery and the prescribing of ancillary services. By
identifying excessive utilization and cost areas, continuous quality improvement
protocols are readily engineered based on internally or externally derived benchmarks.
After adjusting for location and using geographically derived normative charge

information, ETG-based analysis compares the cost performance of providers or entire networks. By using geographically derived utilization norms, the present invention forms the methodology base for measuring both prevalence and incidence rates among a given population by quantifying health care demand in one population and comparing it to external utilization norms. This comparison helps to identify health care providers who practice outside established utilization or cost norms.

Detailed Description Text (100):
FIG. 10 provides an example of a hypothetical time line for a single patient over a one year duration from January, 1995 to December, 1995. FIG. 10 depicts time frames of occurrences for claims classified as management records, i.e., office visit 84, hospital or emergency room visit 85, and surgery and surgical follow-up 86 and for claims records classified as ancillary records, i.e., laboratory tests 87, X-ray and laboratory tests 88 and x-ray 89. Two time lines are provided. A first timeline 71 includes the diagnosis and the time duration of the diagnosed clinical condition. A second timeline 72 includes the claim events which gave rise to the medical claims. Where claim events occur more than once, an alphabetic designator is added to the reference numeral to denote chronological order of the event. For example, the first office visit is denoted 84a, the second office visit is denoted 84b, the third denoted 84c, etc.

Current US Original Classification (1):
705/2

Current US Cross Reference Classification (1):
705/1

CLAIMS:

23. The process as claimed in claim 10, further comprising the step of shifting a medical episode to a different medical episode treatment category based upon changes in patient condition comprising at least one of comorbidity, complication and defining surgery.

27. The process as claimed in claim 1, further comprising the step of comparing financial and clinical performance by analyzing components of a medical care provider's treatment plan by uncovering casemix-adjusted differences in direct patient management, use of surgery and the prescribing ancillary services.

30. The process as claimed in claim 1, further comprising the step of comparing financial and clinical performance by measuring prevalence and incidence rates among a given population by quantifying health care demand in one population and comparing it to external utilization norms.

45. The process as claimed in claim 33, further comprising the step of shifting a medical claim to a different one of the plurality of episode treatment groups based upon a inputting of a medical claim record including changes in patient condition comprising at least one of comorbidity, complication and defining surgery.

49. The process as claimed in claim 33, further comprising the step of comparing financial and clinical performance by analyzing components of a provider's treatment plan for at least one of casemix-adjusted differences in direct patient management, use of surgery and prescribing of ancillary services.

52. The process as claimed in claim 49, wherein the step of comparing financial and clinical performance further comprises the step of measuring prevalence and incidence rates among a given population by quantifying health care demand in one population and comparing it to external utilization norms.